

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior version, and listings, of claims in the application:

Listing of Claims:

1. (Original) A cochlear implant prosthesis of the type having a transducer for converting an acoustic signal to an electrical signal, a plurality of bandpass filtering means responsive to said electrical signal and operatively producing a plurality of bandpass filtered signals, signal processing means responsive to said plurality of bandpass filtered signals and operatively generating stimulation commands, electrode driving means responsive to said stimulation commands and an electrode array coupled to said electrode driving means for operatively delivering to a user of said cochlear implant prosthesis stimulations in accordance with said stimulation commands, said signal processing means including:

- a) period estimation means, responsive to said filtered signals and operatively generating periodicity signals indicative of the periodicity of each of at least a number of said plurality of filtered signals;
- b) amplitude estimation means responsive to said filtered signals and operatively generating magnitude signals indicative of the magnitude of each of said plurality of filtered signals;
- c) selection means responsive to said magnitude signals arranged to select only one filtered signal of said plurality of filtered signals in each stimulation period, said selection means generating said stimulation commands including a command to stimulate by means of an electrode operatively best corresponding to said one filtered signal, said command to stimulate further specifying a time for stimulation to occur dependent on a corresponding one of said periodicity signals.

2. (Original) A cochlear implant prosthesis according to claim 1, wherein said period estimation means operatively determines a value for the time between successive zero crossings by the filtered signal, and responsive to this value generates said periodicity signal.

3. (Original) A cochlear implant according to claim 2, wherein said period estimation means is further responsive to previous values of said time between successive zero crossings, so that a smoothed period estimate value is generated, and responsive to this value said period estimation means generates said periodicity signal.

4. (Original) A cochlear implant according to claim 3, wherein said periodicity signal is scaled to an integral multiple of the time taken to deliver one stimulation pulse.

5. (Original) A cochlear implant according to claim 1, wherein said selection means is responsive to the amplitude and selects said one filtered signal on the basis that said signal has the greatest amplitude.

6. (Original) A cochlear implant according to claim 1, wherein the rates of stimulation operatively delivered to each electrode differ from each other in response to said periodicity signals.

7. (Original) A processing device for a cochlear implant prosthesis, said prosthesis being of the type including electrode driving means responsive to stimulation commands and an electrode array coupled to said electrode driving means for operatively delivering to a user of said cochlear implant prosthesis stimulations in accordance with said stimulation commands,

said processing device being responsive to a transducer for converting an acoustic signal to an electrical signal and including a plurality of bandpass filtering means responsive to said electrical signal and operatively producing a plurality of bandpass filtered signals, signal processing means responsive to said plurality of bandpass filtered signals and operatively generating stimulation commands, said signal processing means including:

- a) period estimation means, responsive to said filtered signals and operatively generating periodicity signals indicative of the periodicity of each of at least a number of said plurality of filtered signals;
- b) amplitude estimation means responsive to said bandpass filters operatively generating magnitude signals indicative of the magnitude of each of said plurality of filtered signals;
- c) selection means responsive to said magnitude signals arranged to select only one filtered signal of said plurality of filtered signals in each stimulation period, said selection means generating said stimulation commands including a command to stimulate by means of an electrode operatively best corresponding to said filtered signal, said command to

stimulate further specifying a time for stimulation to occur dependent on a corresponding one of said periodicity signals.

8. (Original) A processing device according to claim 7, wherein said period estimation means operatively determines a value for the time between successive zero crossings by said filtered signal, and responsive to this value generates said periodicity signal.

9. (Original) A processing device according to claim 8, wherein said period estimation means is further responsive to previous values of said time between successive zero crossings, so that a smoothed period estimate value is generated, and responsive to this value said period estimation means generates said periodicity signal.

10. (Original) A processing device according to claim 9, wherein said periodicity signal is scaled to an integral multiple of the time taken to deliver one stimulation pulse.

11. (Original) A processing device according to claim 7, wherein said selection means is responsive to the amplitude and selects said one filtered signal on the basis that said signal has the greatest amplitude.

12. (Original) A processing device according to claim 7, wherein the stimulation commands are such that the rates of stimulation operatively delivered to each electrode differ from each other in response to said periodicity signals.

13. (Original) A method of operating a cochlear implant prosthesis of the type including a plurality of bandpass filters each having a characteristic centre frequency, said filters generating a corresponding plurality of filtered signals, said prosthesis further including stimulation delivery means coupled to an electrode array, said method including the steps of:

- a) in each of a number of time intervals, determining the amplitude for each of said plurality of filtered signals and a periodicity value for at least some of said plurality of filtered signals;
- b) selecting only one of said signals as a basis for stimulation in each stimulation period; and
- c) applying a stimulation current by means of an electrode of said electrode array tonotopically closest to the centre frequency of the bandpass filter producing the signal determined in step b), said stimulation current being applied during a time interval determined from the periodicity value of the signal determined in step b).

14. (Original) A method according to claim 13, wherein said periodicity value is determined by acquiring a period value for the time between successive zero crossings by the filtered signal, and responsive to the period value generating said periodicity signal.

15. (Original) A method according to claim 14, wherein said periodicity value is determined using a smoothed period value, said smoothed value being determined in response to current and previous values of said period value, and responsive to said smoothed period value said periodicity signal is generated.

16. (Original) A method according to claim 15, wherein said periodicity value is determined for all of said filtered signals.

17. (Original) A method according to claim 16, wherein step (b) includes determining which of said plurality of signals has the greatest amplitude.

18. (Original) A method according to claim 13, wherein the rates of stimulation operatively delivered to each electrode differ from each other in response to said periodicity signals.